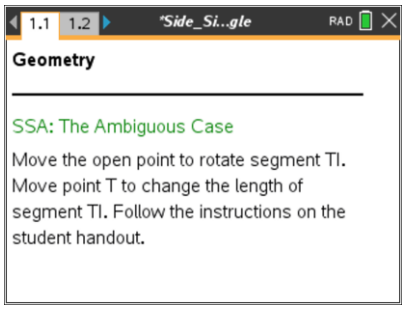
Side-Side-Angle: The Ambiguous Case
Student Activity

Name _____

Class _____

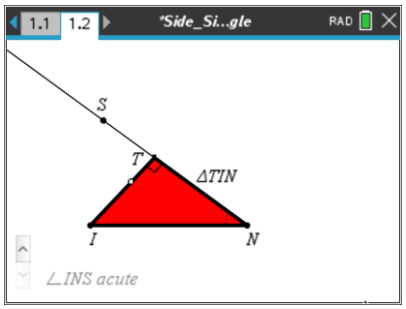
Open the TI-Nspire document *Side_Side_Angle.tns.*

How many triangles can you build given two sides and an angle? In this activity, you will answer this question by experimenting with segment lengths and angle measures.



Move to page 1.2.

Press ctrl ▶ and ctrl ◀ to navigate through the lesson.



1. Grab the open circle and rotate $\overline{TI}$.

   a. What changes? What remains the same?

   b. Grab the open circle to rotate $\overline{TI}$ until a message appears that a triangle has been formed. How many triangles are formed when point T is on $\overrightarrow{NS}$?

2. Move the open circle so that point T is not on $\overrightarrow{NS}$. Grab point T and drag it to make $\overline{TI}$ longer and shorter. Use the open circle to rotate $\overline{TI}$.

   a. What changes? What remains the same?

   b. How many triangles can you form?

3. Fill in the following tables given the relationship of $\overline{TI}$ to $\overline{IN}$.

When $\angle INS$ Is Acute	
Length Relationship of $\overline{TI}$ to $\overline{IN}$	**Number of Triangles**
$TI = IN$	
$TI > IN$	
$TI < IN$	

Click Δ on the screen twice to change the size of $\angle INS$ to obtuse.

When $\angle INS$ Is Obtuse	
Length Relationship of $\overline{TI}$ to $\overline{IN}$	**Number of Triangles**
$TI = IN$	
$TI > IN$	
$TI < IN$	

Click ∇ on the screen to change the size of $\angle INS$ to right.

When $\angle INS$ Is Right	
Length Relationship of $\overline{TI}$ to $\overline{IN}$	**Number of Possible Triangles**
$TI = IN$	
$TI > IN$	
$TI < IN$	

4. a. Compare the three tables. What relationship between $\overline{TI}$ and $\overline{IN}$ will give you exactly one triangle?

   b. State a general rule for being able to form exactly one triangle given any two sides and a non-included angle.

5. a. Given two segments and the angle formed between them (SAS), how many triangles can you build? Explain your thinking.

   b. Given two segments and an angle not included between them (SSA), how many triangles can you build? Explain your thinking.

6. Sherri and Linda were given the information below. Will the triangles they each created using this information always be congruent? Why or why not?

   a. The measure of $\overline{AB}$ was 6 inches. The measure of $\overline{BC}$ was 7.5 inches. The measure of $\angle B$ was 45°.

   b. The measure of $\overline{AB}$ was 6 inches. The measure of $\overline{BC}$ was 7.5 inches. The measure of $\angle C$ was 45°.

   c. The measure of $\overline{AB}$ was 7.7 inches. The measure of $\overline{BC}$ was 6 inches. The measure of $\angle C$ was 45°.

   d. The measure of $\overline{AB}$ was 6 inches. The measure of $\angle B$ was 45°. The measure of $\angle A$ was 52°.

7. Why can SAS be used to prove triangles congruent but SSA cannot?